

and beautifully-chipped leaf-shaped arrow-heads" have been found in one or two instances, and this type of arrow-head, which is unbarbed, is the only one yet discovered. In no case has any trace of metal been found with the primary interments. Fragments of a coarse black pottery are occasionally met with, and in one barrow, that of Norton Bavant, Dr. Thurnam was fortunate enough to discover a tolerably perfect vessel of extremely rude construction, and utterly devoid of the ornamentation usually found in the pottery from the round barrows. Thanks to the courtesy of the Society of Antiquaries, we are enabled to reproduce Dr. Thurnam's drawing of this vessel. We are likewise indebted to the same Society for the other figures which illustrate this paper.

Remains of oxen of the ancient small species, *Bos longifrons* or *Bos brachyceros*, are often found in long barrows not far from the human remains; antlers and bones of the red deer are still more frequent. Tusks and bones of swine have also been discovered. It would appear that oxen were slaughtered at the funeral feasts, and that the heads and feet (the bones of which parts are more frequently found), not being used for food, were buried in the barrow, perhaps as offerings to the gods or to the spirits of the dead.

Secondary interments in the upper portion of long barrows are not infrequent, and afford valuable evidence of the antiquity of these tumuli. Some of these interments are assigned without hesitation to the Anglo-Saxon period; others, again, undoubtedly belong to the Ancient Britons of the bronze age, being sometimes burials after cremation, sometimes interments of entire skeletons in the contracted posture characteristic of the round barrows. In the latter case the remains are frequently associated with pottery undoubtedly of the round-barrow period. In order to show the difference between this pottery found with secondary interments in long barrows, and part of the long-barrow period itself, we reproduce (Fig. 3) an elegantly ornamented drinking-cup found at Figheldean, and now in possession of Dr. Thurnam.

In the present article we have only touched upon some of the most interesting of Dr. Thurnam's researches. It still remains for us to notice the chambered long barrows, and the most important evidence of all, that derived from the skeletons disinterred in both chambered and unchambered barrows. We have been able from the archaeological evidence to gain some idea of the state of barbarism in which these primitive people lived; but still further information is to be obtained even on this point from the very bones of the people themselves; and from these sad relics alone can we obtain any ray of light as to the relation of these most ancient Britons to the population of more civilised times.

HOW LARGE SEEMS THE MOON?

IN a communication addressed to the Association Scientifique, M. Viguier remarks on the linear dimensions which ordinary observers employ to define the size of celestial objects. They seem to imagine that they are really pointing out the size of a meteor, for instance, when they state that it was a yard in diameter, or the like. Of course, such a statement is absolutely without meaning to the astronomer; while the seemingly less precise mode of speaking which compares the size of a meteor to that of the moon, is in reality much more valuable. It is true that when an observer says a meteor was as large as the moon, he makes a wider error than when he says it was a yard in diameter; but the astronomer knows what one statement means, whereas he can form no real estimate even of the meteor's apparent size from the other.

If every observer formed the same estimate of the linear dimensions of a celestial object, one might indeed interpret a statement of the linear dimensions of a meteor. But this is not the case. As M. Viguier justly remarks,

the short-sighted or the far-sighted person each forms his own estimate of the moon's real size, the position of the moon affects the judgment, nay, even the state of the weather influences our instinctive estimate.

But it is interesting to consider what is really implied by such a statement as that the moon is a foot in diameter. This is a size often assigned to the moon, I may remark, though many judge her to look larger. The moon subtends an angle of about half a degree, so that this estimate makes half a degree of the celestial sphere one foot in length. Thus the circumference becomes about 720 feet, and the radius about 115 feet. This, at any rate, is the distance which the estimate assigns to the moon. And this last view is the more correct, since the varying estimates made of the moon's dimensions according to her position, suffice to show that the mind instinctively assigns to the celestial vault a somewhat flattened figure, the part overhead seeming nearest to us. In fact, a common opinion that the moon's diameter looks about twice as large when she is on the horizon as when she is nearly overhead, would assign to the celestial dome the figure of a segment of a sphere, less than a fifth of the sphere's surface being above the horizon.

It is worth noticing, though M. Viguier does not consider the point, that we can conclude from the estimated size of the moon as compared with the intervals separating certain stars, that the mind intuitively assigns to the moon a distance considerably greater than that of the fixed stars. For example, I find that if, when the moon is below the horizon, an observer be asked whether the distance separating the three stars in Orion's belt (ζ from ϵ , or ϵ from δ , I mean) be greater or less than the moon's diameter, the answer is that it is about equal to that dimension. In reality, the moon's apparent diameter is but about one-third of the distance between these stars. It follows that the mind estimates the distance between the stars on a scale one-third only even of the small scale according to which it measures the moon; in other words, that it regards the distance of the fixed stars as about one-third that of the moon.

It may be, however, that the result of this comparison merely indicates that the mind assigns to the celestial sphere as seen on a moonless night a distance equal to only one-third of that which separates us from the faintly seen stars of a night on which the moon is full.

RICHD. A. PROCTOR

NOTES

WE are informed that her Majesty's Government has determined to issue a Royal Commission to inquire into the present state of Science in England. This step will be hailed with the liveliest satisfaction on all sides, and much good will certainly follow from such an inquiry, especially at a time when the arrangements for the prosecution of Science in this country are acknowledged on all hands not only to be "chaotic," but positively detrimental to the national interest. We learn that some of the commissioners have already been designated, but as their number is not yet complete, we withhold the names.

WE have been favoured with a copy of the report just issued by the Rivers Pollution Commissioners on the Mersey and Ribble basins. We hope to return to this subject shortly.

THE first Royal Society's Soirée of this Session will take place on Saturday evening next.

MR. E. RAY LANKESTER has been elected by examination to the Radcliffe Travelling Fellowship at Oxford.

WE have received the third part of Vol. I. of the Transactions of the Edinburgh Geological Society, containing the communications made to that body during its session 1868-1869. These are numerous, and testify to the activity of the members of the

society. The most important are Mr. Powrie's description of the fish remains of the Old Red sandstone rocks of Forfarshire; Mr. Robert Brown's paper "On the geographical distribution and physical characteristics of the coal-fields of the North Pacific coast;" and Mr. Croll's notice of two river channels buried under drift. Mr. Powrie's paper is illustrated with five plates of roughly executed, but tolerably characteristic figures. The part also contains a biographical notice of the late Prof. J. D. Forbes.

The American Gaslight Journal and Chemical Repertory states that Professor Loomis, who claims to have discovered a way to transmit messages by electrical air currents without the aid of wires, wants to be appointed Consul to some European port, that he may experiment on the summit of Mont Blanc.

FOR many years it has been a query whether the electric current might not be brought so far under man's control as to take the place of steam as a motor for machinery, and success has at last crowned the persevering efforts of scientists. At the last exhibition of the American Institute, there was seen an elliptic lock-stitch sewing machine, driven by a small electric engine which might easily be put into a common hat box. A series of eight magnets are set on the periphery of a circle, and around these revolves an armature of steel, which is continuously propelled by the magnetic action, and thus operates the machinery that moves the needle. Connection with this motor is had by means of a small slide within easy reach of the operator, at whose will the current may be cut off entirely, or the speed of the needle graduated as may be desired. The use of this motor, if it becomes general, cannot fail to prove of the utmost benefit to ladies, especially to machine operators, as it does away entirely with the necessity for using the feet, as is now the case, and must be highly conducive to the health of females, who suffer from many diseases that are generated by the constant strain on the pedal and limb muscles. The inventor of the engine in question is Charles Gaume.

A LARGE chemical laboratory is projected at Harvard. The library building is also to be greatly enlarged.

WE regret to learn that a wing of the Emperor's Palace in Peking has been burned, containing the Imperial printing-office, with large stores of books and block-types. The books printed at the Imperial cost for the last two centuries have issued from this printing office.

Prof. W. H. Miller, of Cambridge, has been elected a correspondent of the French Academy of Sciences, in place of Prof. Fournet, of Lyons. The other candidates were MM. Abich; G. Bischoff; A. Boué; Dana; v. Dechen; Domeyko; J. Hall; v. Hauer; v. Helmersen; C. T. Jackson Kjerulf; v. Kokscharow; F. Romer; Scacchi; A. Sismonda; Studer, and Sir W. Logan.

THE Cleveland correspondent of the *Engineer* states that operations are in progress for working upon a large scale the salt deposits underlying Middlesbrough.

WHATEVER may be the case in our own country, it is gratifying to see that there exists in France considerable sympathy between scientific and literary men. Professor Sars, the late eminent zoölogist at Christiansen, left a large family in very impoverished circumstances; and an appeal for their relief was made in our columns by Mr. Gwyn Jeffreys, from his personal knowledge of the case, to the naturalists and geologists of Great Britain. This appeal was seconded in France by M. Alglave, in his *Revue des Cours Scientifiques*; and the result has been highly successful in both countries. It must tend to foster and increase the sentiment allied to that of freemasonry which animates men of science everywhere without regard to nationality. But in France this charitable movement has not been confined to scientific men. M. Emile Girardin, in *La Liberté*, has advocated it with his usual ability and energy; and in the list of French subscribers to the fund are the names of his Excellency

M. Segris, the Minister of Public Instruction, M. Villemessant, the Chief Editor of *Figaro*, Alexandre Dumas, fils, the Society "des amis des lettres" at Paris, the Stanislaus Literary Society at Nancy, Clery the painter, *L'Echo de la Sarbonne*, and many others of a similar kind. Let us hope that science, arts, and letters may be associated here also on the same friendly footing, each promoting the objects of the other, and all working together although placed in different grooves of the machine.

AT the annual general meeting of University College, London, Mr. George Grote presided, and the following students of the College, who had "passed distinguished examinations for University degrees," some at London alone, others at Cambridge as well as at London, were admitted Fellows of the College on the nomination of the Council:—in Arts, Mr. Numa Edward Hartog, Mr. Alfred Slater West, Dr. Richard Francis Weymouth, and Mr. Augustus Samuel Wilkins; in Medicine or Science, Dr. Henry Charlton Bastian, Mr. Marcus Beck, Dr. Frederick George Finch, and Dr. Edward Lloyd Harries Fox.

DR. J. H. GLADSTONE will bring the subject of "Indices of Refraction" before the next meeting of the Chemical Society.

THE Board of Trinity College, Dublin, has nominated the Rev. T. Leslie, F.T.C.D., to the Professorship of Natural Philosophy in Trinity College.

THE President, vice-Presidents, and Committee of the Quekett Microscopical Club have issued cards for a conversazione on Friday evening the 11th, at eight o'clock.

WE learn with much regret that the celebrated botanist, Prof. Fr. Unger, died suddenly on February 13th, at Gratz.

WE hear that the number of candidates for the place of Assistant-Registrar about to be created at the University of London is very great. Among them are men of high position and attainments, who are perhaps desirous to obtain a footing in London. They will know their fate ere long, for the choice of the Senate is to be made in the course of this month.

WE hear that the "Ladybirds" which excited so much curiosity last autumn, have reappeared in large numbers in the neighbourhood of New Wandsworth. So early an appearance will surprise most of us who have been wont to regard these visitors as summer guests.

WE learn from the *Athenæum* that the Société de Géographie has awarded the Empress's new prize of 10,000 francs to M. de Lesseps, and that he has given the money as a contribution to the Society's projected expedition into equatorial Africa.

THE *Pull Mall Gazette* reports that all the medical men connected with the case of the Welsh fasting girl were to appear last Monday before the justices at Llandyssil, to answer the charge of "wilfully killing and slaying" Sarah Jacobs, the prosecution being instituted by the Government.

NOTICE is given that at the annual election of fellows to be held in October next at the University of Cambridge, one fellowship will be given for proficiency in the natural sciences. The examination will be held in the latter half of the month of September, on days hereafter to be fixed. The subjects for examination will be those appointed for the natural sciences tripos. The competition for this fellowship will be open to any member of the University who shall have attained the degree of B.A., B.L., or M.B., and whose standing after such degree shall not exceed three years.

WE have received from the Canadian Government Emigration Office the Year Book and Almanac of Canada for 1870, containing statistics and other useful information relating to British North America, and a map showing the railways and their principal connections.

THE current number of the *Revue des Cours Scientifiques* contains a translation of Mr. Carruthers' lecture at the Royal

Institution, on the Cryptogamic forests of the coal period, and a continuation of the report on the Anthropological Congress at Copenhagen.

Cosmos states that the cavern of Montesquieu-Avantès (Ariège) has been recently explored by M. F. Regnault, of Toulouse, who discovered, on the surface of a hearth covered with stalagmite, bones of ruminants and human bones, the latter consisting of fragments of skulls, leg and arm bones. The whole were sent to M. F. Garigou, who declares that both kinds of bones are broken in the same manner, and each bears indications of a smashing instrument and of a sharp tool that has scratched them. These bones are said to be exactly similar to those which were regarded as furnishing decided proof of cannibalism, at the Anthropological Congress in 1867. M. Garigou writes that he has no hesitation in agreeing with MM. Spring, Dupont, Schaffhausen, Broca, Carl Vogt, Steenstrup, &c., that primitive man was, like modern savages, anthropophagous.

Les Mondes also reports that Prof. Capellini of Bologna, has discovered remains of man and of animals in a cavern in the island Galmeria, the access to which is difficult and dangerous. In excavating he found many implements of flint and stone, the working of which showed that they belonged to the most remote stone age. Besides objects referrible to the hand of man, he found many which had been carried there by the human inhabitants of the cave, and a considerable quantity of animal bones, mixed with the human bones. The condition of the latter indicated that the cave had been inhabited by cannibals. At the centre of the cave were traces of a hearth.

DR. BERTHOLLE has communicated to the Société Médico-Chirurgicale the particulars of what he believes to be a case of spontaneous combustion, which recently came under his notice, the subject being a woman who was an habitual spirit drinker frequently suffering from *delirium tremens*.

THE *Siccle* states that M. Combes has declined to act on the commission charged with the temporary direction of the Paris Observatory, and that his place has been filled by M. St. Claire Deville.

WE have received the prospectus of a new series of the "Zeitschrift für die gesammten Naturwissenschaften," edited by Dr. C. G. Giebel and Dr. M. Siewert, of Halle. One of the main features of the journal is to be the publication of monthly reports of the progress of astronomy and meteorology, physics and chemistry, geology, mineralogy, palæontology, botany, and zoology.

Cosmos reports the death of M. Florent Prevost, assistant-naturalist at the Museum of Natural History, and known for his useful work in connection with the agronomic applications of zoology.

WE have received from the Chairman of the Technological Commission of Victoria, a report on the promotion of technical and industrial instruction, by lectures and otherwise, among the working classes of Victoria.

THE Food Committee of the Society of Arts had recently before them a specimen of meat treated by Professor Gamgee's process. A joint of mutton—stated to be part of a sheep slain on December 28th, and to have been, since the treatment, simply hung up in Professor Gamgee's premises—was roasted and tasted by the Committee, who pronounced it very satisfactory; but the Committee considered that a test over a longer time and at a warmer period of the year, was necessary before any decided opinion as to its success could be given. Another joint—from a sheep slain on the 22nd December—was ordered to be placed in charge of the Secretary, to be tested at a future time. Mr. Tallerman also exhibited specimens of meat imported from Australia, and showed it both cooked and uncooked. He explained the plan he had adopted, by means of which cheap dinners were prepared from it

for the use of the people. Specimens of raw meat from Australia, preserved in tins by Manning's process, were brought before the Committee. The meat consisted of beef steaks, which were cooked and tasted by the Committee. The meat, though sound, was not considered satisfactory in flavour.

Cosmos reports the death of M. Foucou at New York, shortly after establishing himself at Oil Creek, where he intended to carry on the working of petroleum, to the industrial application of which he had given much attention.

MR. HARTNUP, astronomer at Liverpool, has published his annual report to the Marine Committee Mersey Docks and Harbour Board, and is no doubt not a little gratified at dating it from a new Observatory. The old building having been swept away by dock improvements, a new site was found on the left bank of the river, on the top of Bidston Hill, about a mile to the rear of Birkenhead Docks, and two hundred feet above the mean sea-level. The new building occupies about five hundred square yards in an acre of land set apart for the use of the Observatory. Underground rooms, with arrangements for elevating the temperature at pleasure, are provided for the testing of nautical instruments. In each hot-air chamber one hundred chronometers can be placed at once for examination. Two octagonal, domed rooms, twenty feet in diameter, rise at opposite angles of the building, one being occupied by the transit, the other by the equatorial instrument. In the words of the report, "The site is remarkably favourable for astronomical and meteorological observations." We may, therefore, hope to hear of much good work being accomplished at the Liverpool Observatory. To facilitate comparison of chronometers without the trouble of carrying them to the Observatory, a time-gun has been placed on the river brink near the landing-stage at Birkenhead. This gun is fired every day at one o'clock by a galvanic current sent from the standard clock on Bridston Hill, and masters of vessels lying in the port thus get the true time. Besides the observations of transits required for the service of the establishment, the usual meteorological observations have been taken, comprising daily and hourly readings of the barometer, the velocity and direction of the wind, the amount and duration of windfall, and the mean daily temperature of evaporation. All these results, collected into tables, are published at the end of the report, and thereby add to its utility. The site of the old Observatory was in latitude 53° 24' 48" N., and longitude 3° 0' 1" W. from Greenwich: the new Observatory is 17.04 seconds farther to the west.

ACCORDING to the Sydney Correspondent of the *Times* the production of sugar in Australia appears to be progressing rapidly and successfully.

WE learn from the *Society of Arts Journal*, that at a recent meeting held at the Town Hall, Reading, it was decided to accept the offer made by the Hon. Auberon Herbert, and to establish a free library. ▽

FOR many years past the French physician, M. Burg, has been engaged in investigating the effect of copper as a preservative and curative agent in cholera. In support of his theory, M. Burg instances the immunity enjoyed by workers in this metal from cholera. He has obtained from the Prefect of the Paris police, certain statistics which go to prove that this immunity in the case of copper-workers has a real existence. In the instances of jewellers, engravers on metal and clockmakers, out of a population of 11,500, there were 16 cases of cholera, or 1 in 719. Engravers in copper, makers of metal eyelet-holes, jewellers working with copper, had, in a population of 6,000, 6 cases, or 1 in 1,000. Founders, tap-makers, chisellers, turners in bronze, lamp-makers, and workers in counterfeit gold, had, in a population of 14,000, 7 cases, or 1 in 2,000. Opticians using copper, mathematical instrument makers, musical instrument makers, stampers, metal polishers, &c., out of a population of 5,650, had not a single case of cholera.